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Mediating Low-Carbon Urban Transitions?

Forms of Organisation, Knowledge and Action

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Abstract

Increasingly at the scale of cities strategies and plans to respond to the challenges of climate change and constrained resources are being developed. A range of climate change plans, low carbon strategies, peak oil preparations and so on have been developed, often with ambitious aspirations. At the same time new and reconstituted ‘intermediary’ organisational forms are working between the priorities of these plans and the contexts of their ‘application’. This is the movement between the ‘what’ of the plans, strategies and preparations and the priorities they embody and the ‘how’ of attempts at their accomplishment. Drawing on research in Greater Manchester, in this paper we examine the organisational contexts constituted for such a purpose and ask fundamental questions about whose priorities are being advocated, where and how this is organised and what the implications of this are for forms of urban transition.

1. Introduction

This paper contributes to an emerging but increasingly vibrant debate about the role of cities in transitions to low carbon energy futures (Hodson and Marvin, 2010a,b; Bulkeley et al, 2010). In doing so it starts from the view that there are many ways that energy infrastructures, that support the social and economic life of the city and that produce particular ecological consequences, can be shaped and that potentially different coalitions of social interest can claim to speak on behalf of the city. Consequently, this paper's focus is on the intersection of two sets of issues. The first issue is the relationship between city and energy system in a period of conflicting economic, ecological and political pressures and the search for a low carbon future and the second is the social interests, institutions and actors, who seek to shape such a relationship and the ways in which they are organised to act in doing so. In that sense our concern in the paper is with: assessing the 'intermediary' contexts constituted for the purpose of low carbon urban transitions; understanding the politics of whose priorities are dominant in these contexts; and what the implications of this are for urban transitions.

Cities and regions are integrated into wider energy systems as key sites of consumption in complex socio-technical networks and they are implicated in hierarchies of multi-level governance. There are clearly different scales of action – national, regional, city-regional, publics, etc – involved in coordinating energy systems and the transition to low carbon futures and there are likely to be different strategic priorities at these multiple scales of action. This emphasises the importance of understanding the relationships between these scales and how and why they are coordinated, in tension or even disconnected. It involves examining the relationships between national priorities and plans and how these are interpreted and responded to at an urban level and also the extent to which cities' strategies and national plans and priorities can be better integrated. Consequently, understanding whose priorities it is that shapes the activities that aspire to constitute a particular low carbon urban energy transition is an important issue.

Analytically the focus of this paper is whether new organisations are created to enact a low carbon urban transition or whether existing organisational contexts are adapted to bring together (or exclude) a range of national, local, regulatory, utility and other relevant social interests. This means understanding the type of low carbon energy future - and its relationship to the city - that is envisaged but also the social interests who are favourably positioned and disposed towards such a future and the processes of participation that result. This is particularly important in a wider context of shifting landscape conditions and whether the transition envisaged represents something fundamentally different from the existing energy system. Our concern is with how these multiple social interests are organised and how their different knowledges are organised in to capability to act.

The paper does this through a case study of the early stages of attempts to undertake a low carbon energy transition in Greater Manchester. . Greater Manchester has sought in recent decades to re-position itself from an industrial city to a post-industrial entrepreneurial city where new formal metropolitan governance arrangements that have been absent since 1986 have since the late 2000s been under development. This changing governance context has a significant emphasis on developing low carbon energy capabilities alongside a range of other, primarily economic, priorities. This means that the power relationships between national government and ‘local’ social interests are frequently negotiated and played out through these different priorities. This focus on the dynamics of transition in Greater Manchester provides a context to understand the ‘type’ of transition envisaged, the social interests behind such a transition and what the likely consequences of it are. Exploring these issues in relation to a changing governance context provides the potential to offer lessons for other low carbon urban transitions in different contexts.

The rest of the paper is divided into five parts. First we review the literature on socio-technical transitions and identify the implications for place-based transitions. Second, we use documentary analysis of national policy documents to identify national priorities around energy and climate change and the envisaged role of place-based transitions. Third, we use documentary analysis, observational material and an interview programme

with city-region scale actors to analyse the forms of experimentation taking place in the emergent Greater Manchester city-region as part of attempts to forge a low carbon city-region. Fourth, we identify the key issues from the Greater Manchester case study for understanding whether a urban low carbon transition has – or is - been enacted. Finally, we finish by offering key conclusions for low carbon transitions and identify issues for future research.

2. Place-Based Low Carbon Transitions and Organising Action

Transitions analyses, both historical and prospective, have been put to work across a range of substantive technological, systemic and sectoral areas (Geels, 2004; Voß et al, 2006; Smith et al, 2010). Transitions approaches, through their threefold concepts of landscape, regime and niche and their interrelated mobilisation as a multi-level perspective (MLP), have also allowed researchers to examine the role of experiments and niches in relation to existing socio-technical regimes and the dynamics between regime lock-in and niches as the basis for regime transformation. The potential of the MLP has been highlighted in ‘its use as a flexible heuristic’ (Smith et al, 2010, p.436) and through the interest shown in it by a wide range of researchers and policy interests.

A central issue for us is to what extent the MLP can be utilised to understand the development of place-based low carbon activities. In particular, analysing the extent to which transitions can be undertaken at the level of the city is important because of the complex pressures and tensions for urban economic growth, national targets for reducing sub-national carbon emissions and developing effective responses to the threats of climate change (Hodson and Marvin, 2010b). Urban authorities and wider coalitions, in particular in world cities, have sought to (partially) reconfigure energy systems at the level of the city; they have done this and are doing this to try and assert control over the organisation and functioning of energy systems to build greater security of supply for cities and the social interests who benefit from urban growth and also to meet carbon reduction targets. The difficulty of this, in a UK context, is that the promotion of a competitive city-based economic growth takes place in a broader context where national

government engages with cities in national space differentially but also where energy regimes or systems are not organised at a city-regional scale.

The relationship between national government and urban actors is underdeveloped in transitions approaches (Coenen et al, forthcoming). The MLP has primarily been concerned with national level transitions. There are important issues raised by the ways in which national governments view the role of cities and communities in undertaking transitions. Re-organising energy systems, or effecting a transition at the city-scale, therefore, necessitates a transition from a largely regionally nationally organised energy regime in a wider national system but also requires the constitution of a city-scale regime with variable levels of discretion afforded by national government. In this sense, when we talk about an urban low carbon transition we are referring to a re-scaling of the energy regime, in ways which transform the city as well as the energy regime and that also requires the development of - and the 'intermediary' organisation of - the capacity to act in undertaking such a transition.

Yet a number of recent contributions have highlighted that locating the role of the city – theoretically, conceptually and empirically - in low carbon transitions is extremely difficult (Hodson and Marvin, 2010a; Späth and Rohrer, 2010; Bulkeley et al, 2010; Coutard and Rutherford, 2010). The MLP says little explicitly about cities, who, what and where the city is, and their roles within transitionsⁱ. Locating the city in low carbon transitions, given its relative neglect in the MLP, is likely to be the subject of politics and struggle amongst researchers seeking to understand the role of cities in transitions and also between policymakers and other interests engaged in the practice of transitions. The MLP provides us with a foil - a 'flexible heuristic' (Smith et al, 2010) - through which to think through the roles of the city in low carbon transitions.

Given the politics and struggle between differentially positioned institutions and social interests involved in transition activity, whether transitions can be managed in the sense of purposively steered or not is a difficult issue (see Shove and Walker, 2007). This should not be treated as a simple yes or no question. There are significant positions in

between, including the view that transitions can be the consequence of purposive intent, unintended consequences and subsequent adjustments. This acknowledges the teleological leanings of accounts that view the management of transitions in time-bounded ways rather than viewing time horizons as looser reference points and as part of ongoing and unfolding processes of transition.

Whether the city is viewed as an actor in its own right, a niche for experimentation to think about new ways of organising relationships between energy producers, consumers and flows through the city, a regime of existing relationships between energy producers, consumers and flows through the city or any other conceptualisation has important consequences for how a series of contexts and relationships within the city are understood. The MLP can further assist us here in thinking about what broader changes in political economy are contributing to. How, for example, landscape economic and ecological conditions shape attempts to reconfigure energy systems at a city-scale. The ways in which reconfiguring energy systems is as a means of securing the low carbon resource flows to literally fuel new economic accumulation strategies. But also the ways in which the development of new accumulation strategies, through low carbon transition, then start to feedback into changes in landscape conditions through re-enforcing the predominance of the ideology of competition between places as underpinning economic growth.

Yet the framing of low carbon transitions can be manifold and often the basis for different framings is the participative constitution of ‘visions’ by transition actors (Hodson et al, 2010). The act of representing low carbon futures through the mutual future of city and infrastructure is underpinned by political efforts to bound time-space through socio-technical transition in the service of particular social interests. The concept of ‘vision’ in the MLP is important as ‘the articulation of visions and expectations to provide an orientation towards the future and give direction to learning processes’ (Geels 2005, p.366). Yet, particularly given the range of regime interests - many of whom have incentives to defend the status quo - urban decision makers and potential new interests with motivations for a new or reconfigured regime, it is important to recognise the

struggles and negotiations that inform the production of both dominant and competing visions. Visions, in this understanding, are re-cast as the symbolic representations of the future relationships between city and regime that are produced through these relational struggles to define and categorise.

Seeing a vision as representational space (Massey, 2005) means that complex and deeply political relationships between an energy regime and the city can be articulated and framed in highly exclusionary ways that are presented as fixed, closed, static and discrete. It also excludes a multiplicity of co-existing narratives and potential narratives. Seeing space as actively, relationally and relatively produced (Harvey, 2006; Massey, 2005) offers the possibility to understand attempts to define and categorise the relationship between a future energy regime and the city. It offers this not only in relation to existing and absolute representations of regime and city but also through the ways in which the multi-level governance field of interrelationships of institutions and social interests seek to re-constitute a mutual identity for the regime and the city – this we shall illustrate in Section 4.

The field of such social interests (Bourdieu, 1993) is not an equitable one and highly particular coalitions of social interests, in relation to particular places, are often able to mobilise financial, relational and knowledge resources through which they produce the symbolic ‘visions’ of what the low carbon future of the city should be (Hodson et al, 2010). Whether these visions are genuinely participatory and inclusive and link to processes of mobilising effective capability to enact a transition or whether they are largely representations of the future relationship of city and energy regime that are produced by narrowly constituted social interests are, again, parameters which contain a series of potential intermediate positions. Underpinning this are different ‘types’ of ‘intermediary’ organisational contexts and cultures that mediate and through which social interests and a range of resources coalesce (Hodson and Marvin, 2010a).

Low carbon urban transitions are then about competing views of the role of the city, the type of transition that is deemed to be required, the politics of participating in producing a

‘vision’ of the future, how to translate that vision, and, therefore, the variability of the consequences of a transition. What we seek to do in the remainder of this paper is to focus on Greater Manchester to understand the multiple organisation of ‘transition’ activities within the city; to understand the politics of the role of the city, dominant visions of its low carbon future, messy attempts to translate such a future from national political priorities, to ‘shared’ city-regional priorities and subsequently to begin the process of their material manifestation; and the consequences of this. In the next section we review the different national policy priorities and the ways in which they provide a context of enablement and constraint in Greater Manchester.

3. National Low Carbon Policy Priorities and the Role of Place

Understanding recent national low carbon/place policy priorities in the UK is far from straightforward. To take the area of energy policy, for example, until the Department of Energy and Climate Change (DECC) was created in 2008 there had not been a solely designated Department of Energy in the UK since 1992. This meant that historically government priorities around energy were formulated in a multiplicity of departments which had a range of issues as their core brief – trade and industry, environment, food and rural affairs etc. The consequence of this is that current UK priorities around energy need to be pieced together from a variety of different departmental positions. In relation to the current and future shape of pressures on the UK’s energy systems and the priorities that are formulated by the UK government four departments are of particular importance: the Department of Energy and Climate Change (DECC); the Department for Business, Innovation and Skills (BIS); the Department for Environment, Food and Rural Affairs (DEFRA); and the Treasury (HMT). Additionally, in relation to territorial aspects of UK government and relationships between national government and cities and regions, departmental priorities are particularly associated with the Department for Communities and Local Government (DCLG) and HMT. Experimentation with the governance of territorial and energy priorities are mediated through five dominant strategies (see Table 1).

Table 1: UK Energy Priorities and their Relationship to Territory

| PLAN | PRIORITIES | PROMOTER | SPATIAL CONCEPT | EXEMPLIFICATION |
|---|--|-------------------|--|---|
| Climate Change Act; Energy Act 2008 | Binding, long-term statutory greenhouse gas emissions reductions – 80% 2050; 34% 2020 – carbon targeting and budgeting | DECC/DEFRA | Potential for budgeting, targets and the cascading of these down through various territorial tiers | Place-based low carbon budgets |
| UK Low Carbon Transition Plan (from July 2009) | Long-term transition plan to a UK low carbon future | DECC | Multiple views of places both implicitly and explicitly | Community pilots; Competitions for towns and cities |
| Low Carbon Industrial Strategy (from July 2009) | Low carbon industrial interventionism | BIS/DECC | Low carbon economic areas | North East England; South West England; M4 Corridor; Greater Manchester |
| Statutory City Region Pilots (from April 2009) | Design & piloting of city-region governance structures for sustained economic growth | Treasury/DCLG | City regions | Manchester; Leeds |
| Re-designing Sub-national Governance (from Spring 2010) | Stripping out sub-national institutions, setting up LEPS, to promote new forms of sub-national economic activity and competition | BIS/DCLG/Treasury | Local economic partnerships (LEP) | Local economic partnerships – abolishing intermediate governing architecture and construction of ‘market’ framework |

Setting Parameters for Urban Responses through Targets, Plans and City-regions

The significance of the 2008 UK Climate Change Act was in its positioning of the UK as the first country in the world to have a legally binding framework for cutting carbon emissions. It does that through setting legally binding targets, creating powers to address those targets, providing the institutional framework to underpin the achievement of these targets and to do so in ways which not only sets out the UK's response to climate change but which is accountable to the UK Parliament (DEFRA, 2008).

The binding targets for the UK mean that regardless of whether and on what scale there is international action on climate change the UK must act. Among the key priorities in the Act is the setting of legally binding greenhouse gas emissions reduction targets of at least 80 per cent by 2050 with an interim reduction in emissions of at least 34 per cent, from a 1990 baseline, by 2020. This is to be achieved through five year carbon budgeting systems. These developments create new pressures relating to climate change and carbon regulation (While, 2008). In addition to statutory carbon reduction targets cascaded down from international agreements (Bulkeley and Betsill, 2003) those developed by national government place renewed emphasis on to sub-national territorial units, and will then place a premium on the ability of states and territories to better manage energy consumption and accelerate the development of low carbon energy transitions.

In July 2009, the UK government published its Low Carbon Transition Plan (LCTP) which detailed broadly how the UK would meet the 2020 and 2050 emissions reduction commitments set out in the Climate Change Act. The Plan is underlain by five stated principles: first, to protect the UK public from the immediate risks of climate change; second to anticipate how the consequences of climate change are prepared for, particularly in relation to infrastructure and housing; third, that climate change requires a new international agreement on global emissions reduction; fourth, that the UK can play its part by developing a low carbon country to meet targets set out in the CCA and address vulnerabilities and promote economic opportunities; fifth, that addressing climate

change requires widespread participation from communities, businesses, individuals and so on (DECC, 2009). LCTP is not only a transition route map to 2020 for the UK but also operates in prioritizing the carbon savings expected across different sectorsⁱⁱ.

The Low Carbon Industrial Strategy (LCIS) was launched jointly by the Department for Business, Innovation and Skills (BIS) and DECC in July 2009. It aims to position British businesses to secure the economic and job creation opportunities of a low carbon transition and, in doing so, to minimize the economic costs of inaction. The strategy details a range of potential low carbon sectors and technological areas - wind, wave, tidal, low carbon vehicles, carbon capture and storage etc - and also a more strategic approach to the development of low carbon economic activity and technologies across the regions of the UK, particularly through designating low carbon economic areas (LCEAs).

A less directly ‘interventionist’ national government role in sub-national activities was outlined in 2008 in the UK government’s support for the creation of two city-regions in 2009 and, in doing so, the development of new metropolitan governance structures. The broad parameters within the city-regions were to operate as statutory forms of sub-regional cooperation between local authorities with the aim of them being significant contributors to sustainable forms of economic growth. Low carbon economic activities were also worked into these proposals as city-regions took a more active role in shaping low carbon transition in their own contexts.

From Targets and Plans to Practice: New Industrial Interventionism or Re-designing Sub-national Governance?

The priorities of the Climate Change Act and its emphasis on emissions reduction are broadly supported across UK political parties. There have, similarly, been few dissenting political voices in relation to the LCTP. The principal political tension is in the process of how the strategic priorities will be achieved – what are the mediating frameworks and institutions, what economic, social and knowledge resources are allocated to them? While

there appears, superficially at least to be a broad consensus around the policy priorities - the achievement of large emissions reduction - the central controversy is around the mode of governing and the ways in which 'intermediary' activity is organised.

The tension is between, first, new forms of state industrial interventionism in regions, city-regions and pan-regions and, second, in constructing new forms of national-sub-national governance fixes that sees the state less in the direct role of industrial intervener and more re-cast as a 'facilitator' for city-regions and local economic partnerships to create the conditions for market-based and private-sector led activity. This struggle was inherent within the Labour government, which governed until 2010, and cut across its different strategies. The subsequent coalition government, from May 2010, is comprehensively re-designing sub-national governance by actively seeking to abolish and re-design institutional mediators between its central departments and places to create the conditions to compete for limited resources and create private and entrepreneurial responses that will 'emerge' and develop place-based low carbon activities. In short, the existing dominant mediators of national-sub-national relations - Regional Development Agencies - are being abolished and replaced by local economic partnerships (LEP). At the same time a much less well resourced Regional Investment Fund - c£1bn - will intensify competition between places for national resources and support.

The national policies and priorities that we have reviewed encompass a range of economic, environmental, technological and territorial issues. The ways in which different priorities coalesce within the context of a particular city-region are unclear but are likely to involve the negotiation of these different national priorities with fledgling city-regional priorities. The mediation of these city-regional priorities, their organisation as capability to act and the ways in which they interact with national priorities is the issue to which we now turn in relation to a case study of Greater Manchester.

4. Mediating a Low Carbon Energy Transition in Greater Manchester?

The national priorities and strategies outlined set the parameters within which an understanding of the responses at the city scale need to be framed. In this section we address how city-regional capability to act is developed in Greater Manchesterⁱⁱⁱ, what a low carbon future looks like and how it is made. The development of a response to climate change is deeply intertwined with new city-regional governance structures more generally. Such responses will be in part about the implementation of national policy and targets and part concerned with territorially specific objectives. In this respect we examine how the boundary between the disciplinary role of national government and a more discretionary city-regional agenda is negotiated.

We do this in a context where the energy regime is organised in ways that make city-regional control of such a regime extremely challenging. By regimes we are talking about the socio-technical energy regime, which are ‘the semi-coherent set of rules carried by different social groups. By providing orientation and co-ordination to the activities of relevant actor groups, ST-regimes account for the *stability* of ST-configurations’. These configurations will contain actor-networks of producers, users, policymakers and public authorities, suppliers of materials and components, financial capital and research and development. ‘This stability is of a dynamic kind, meaning that innovation still occurs but is of an incremental nature’ (Geels, 2002, pp. 1260, original emphasis).

To illustrate this, for example, the electricity regime that supplies the citizens and businesses of Greater Manchester is organised through a private regional utilities, national transmission and power producers. In the North West of England region electricity is generated primarily through a combination of four large power plants (one coal, two gas and one nuclear), but also through medium sized CHP plants and smaller embedded generation of renewables and small scale CHP. There is a high voltage electricity supply network and a low voltage electricity supply system, each operated by different commercial interests. Within this system there is limited spare capacity in the regional high voltage transmission lines which are part of a national network. Significantly the network in the North West mediates the distribution of electricity from Scotland which has excess capacity to the south of England where demand far outstrips

electricity production in the region. The consequence of this is that the transmission network in the North West of England is shaped by interdependencies between the north and south of the UK. Energy demand and consumption in the North West can be understood not only in respect of domestic consumption but also through the large manufacturing base around chemicals, paper and other energy intensive industries. There is recognition within many of these large energy intensive industries that energy use in relation to output needs to be made more efficient and there have been efforts to this end in response to growing costs of energy and fuel but also in response to national government energy efficiency programmes.

One can see from this brief example of the regional organisation of electricity that although energy may be consumed by city-regional businesses, citizens and organisations the constitution and organisation of the energy regime involves many actors and issues. This includes producers, feedstocks, supply networks, multiple technologies, regulators, housing and commercial buildings, national government and consumption patterns. But also intersecting with the regime are multiple transport systems and industries that operate within and beyond the city-region, relationships with other regions and so on. This illustrates that the constitution of the regime on which the city-region is reliant is not coterminous with Greater Manchester.

The ‘Vision’: Climate Change as a Low Carbon Economic Opportunity for Greater Manchester and Meeting National Targets

The Association of Greater Manchester Authorities (AGMA) since 1986 has worked to coordinate the actions of the 10 Greater Manchester local authorities on cross-boundary strategic areas - such as transport and waste - that are seen as most effectively organised at a metropolitan scale. In January 2008 the Executive of AGMA agreed in principle to support the establishment of a Climate Change Agency (CCA) across the city region. The development of the CCA was the product of a confluence of activities that sought to coordinate local actions and ‘sustainable’ economic strategy at a city-regional scale. A significant step in this was the 2008 ‘Mini-Stern’ for Manchester commissioned by

AGMA and undertaken by the consultants Deloitte. It aimed to produce a re-scaled version of the Stern Report that was written for the UK Treasury in 2006 by the economist Nicholas Stern, reviewing the economics of climate change.

The Mini-Stern sought to calculate the cost of climate change for the Manchester city-region and possible strategic responses in the short-to medium-term particularly given international pressures and national legislation on climate change. The report was framed relatively narrowly in that it examined the economic costs of inaction on climate change and the economic opportunities of early action. On the basis of analysis conducted using a methodology developed by Deloitte, it calculated that inaction on climate change would potentially cost Greater Manchester £21 billion over a 12 year period and £72 billion at the North West regional level. It prescribes a necessity for action at the Greater Manchester level that prioritises distinctiveness, early movement, technology-led responses, business and investment, business support and attempts to attract inward investment. The focus on energy in the review is oriented towards re-shaping city-regional energy flows in line with meeting renewable energy and other national targets.

Consequently, it argues for a strategic approach to energy production, consumption and the reconfiguration of Greater Manchester's energy system through energy efficiencies and new technologies to reduce economic cost and meet carbon reduction targets. In this respect, to achieve national targets but also to meet the city-region's energy 'needs' is linked to achieving greater control over energy production and consumption relationships through coordination of urban regeneration activities and latent innovation capacity in Greater Manchester. Mini-Stern also raises the importance of eco-innovation and creating new markets for services and technologies. In doing this the role of the public sector is promoted as an exemplar by leading through example in terms of procurement strategies and its own estate. But also this is part of an attempt to create a culture that is conducive to business investment, inward investment and the availability of support and advice. In doing this there is also an emphasis on developing and building skills and capacity - with a role for higher education institutions - and the alignment of policies. The logic of the report appears to be in extending the economic competition between places

into the sphere of climate change and for Greater Manchester to seek to exploit a first mover advantage and distinctiveness in eco-economic competition. It is in line with addressing (and ignoring) many of these issues and concerns that the Climate Change Agency was set up in parallel with two other energy intermediaries (see Table 2).

Table 2: Greater Manchester ‘Low Carbon’ ‘Intermediaries’

| Organisation | Priorities | Promoter | Spatial Concept |
|--|--|---|--|
| Greater Manchester Climate Change Agency (CCA) | Develop capacity for behavioural change work, business support, planning policy and procurement - development of critical infrastructure including CHP and renewable energy installations | City-regional (AGMA) – Environment and Economic Commissions; National government (Treasury; DCLG) | Constructing the city-region through responding to climate change and developing capacity to act |
| Greater Manchester Low Carbon Economic Area (LCEA) | LCEA ‘retrofit’ is a 5 year initiative - operates in public and private sectors addressing insulation, smart metering technologies and small scale renewables - key national priorities - creating low carbon economic opportunities | National government designation LCEA proposal developed by the GM Environment Commission/Economic Commission with national government departments and regional and national agencies | LCEA primarily exemplified as a zone – Oxford Road Corridor - of the urban core rather than the extended city-region |
| Greater Manchester Energy Group | Provide effective strategic governance working to coordinate energy and energy-related actors and issues at a city-regional scale | Intended to include energy companies, public and private sector interests, representatives from across city-region and national government - supported by officers | Strategic overseer for energy issues across GM |

Making a Greater Manchester CCA: Economy and Environmental Priorities

The CCA is closely intertwined with the development of new city-regional governance structures for Greater Manchester. It was intended that the Agency would build capacity for behavioural change work, support for businesses, planning policy and procurement and the development of critical infrastructure - this included combined heat and power and renewable energy installations. During 2008 work on developing the governance arrangements for both the Environment Commission and the CCA were led by the Environment Commission Development Team (ECDT) and in mid 2009 AGMA approved the establishment of the CCA as a Shared Administrative Structure prior to it becoming a limited company.

Although the establishment of the CCA was the remit of the Environment Commission initial development funding for it was provided by the NW Regional Development Agency (NWDA) channelled through the city-regional economic partnership Manchester Enterprises (ME) - which was the forerunner to the Economic Commission at city-regional level. Part of this funding stream supports a Carbon Manager within the Economic Commission to support the ECDT. Importantly we can see how the funding streams and their different strategic priorities begin to contribute to the constitution of a CCA that blurred the distinctiveness of the Environment Commission and the Economic Commission as well the environmental and economic priorities underpinning each commission. These, of course, are not necessarily in conflict - in fact the Mini-Stern would suggest they are complimentary - but how these interrelationships were understood and developed is particularly significant for the type of approach to climate change that was produced. The parameters and activities of the CCA were developed not only through these processes and relationships within AGMA, the NWDA and ME but also through discussions with central government. The aim was that by summer 2010 the CCA would be established as a legally constituted body.

The two principal roles of the CCA were seen as the delivery of new programmes devised on behalf of the Environment Commission and to develop capacity and resources to deliver existing projects. Initially this meant bringing existing and planned inter-authority work within the CCA through a three-year business plan. This resulted in developing a mix of new initiatives, such as the CCA and the Low Carbon Economic Area (LCEA), but that also encompassed and re-packaged existing activities across a range of partners and scales. For example, this included Greater Manchester activities in a national network of local energy efficiency advice centres, Manchester City Council's work as part of a national Low Carbon Cities Programme (LCCP) and Manchester is My Planet's (MiMP) work as part of an EU programme.

A significant part of the rationale for a metropolitan scale CCA is that it is an appropriate strategic scale to act on climate change because effective local capacity to act on climate change was missing and that developing such capacity requires the sharing and coordination of resources, particularly in relation to energy, water, transport and emergency planning. This attempt to develop new governance structures is not without its difficulties. In relation to the challenges of climate change and energy it will require cross-commission working as responses encapsulate spatial planning, critical infrastructure, public health and economic activity.

A Low Carbon Economic Area – Showcasing Technologies and Meeting National Targets

Greater Manchester was designated in December 2009 as the UK's fourth Low Carbon Economic Area (LCEA) for the Built Environment. The draft prospectus for the Greater Manchester LCEA was produced by consultants Ernst and Young under commission from AGMA. The prospectus linked together the issues of carbon reduction with the existing built environment and the need for systemic retrofitting particularly through demand-side management measures – energy efficiency measures and alternative sources of heat and power in residential, private business and public buildings - and, in doing so, creating low carbon economic opportunities. The LCEA frequently alludes to Greater

Manchester's existing assets in relation to the exemplification of retrofitting. This includes the largest photovoltaic retrofit in the UK of Manchester's CIS tower and the proximity of leading research and development institutions, particularly in relation to the built environment. And it is also claimed that the LCEA will contribute to saving 6 million tonnes of CO₂, deliver up to £650m additional Gross Value Added (GVA), support 34,800 jobs in total, and contribute wider economic, learning and best practice benefits to the region and to the UK generally.

The LCEA prospectus pointed out that such responses were expected to contribute to systemic and transformative change in buildings, the use of energy and reduction in carbon emissions. Yet the prospectus also pointed out that systemic change required the development of a new skills capacity and understanding of the types, range and extent of low carbon technology providers and supply chains within the city-region. If achieved building energy performance standards would be improved, mandatory carbon reduction targets would be met in a cost efficient way, and a market developed for commercial retrofit within Greater Manchester. The LCEA proposal was developed by the city-region's Environment Commission but was also based on inputs from the Economic and Planning and Housing Commissions and also national government departments and national and regional agencies. The aim was that by April 2010 a Joint Delivery Plan would be developed that would be shared by national government and agencies, regional and local government and agencies.

The visibility and symbolic importance of the LCEA is important as the aim of the zone is also to act as an attractor for inward investment. More specifically the LCEA 'retrofit' programme is a five year initiative that operates in both public and private sectors addressing insulation, new smart metering technologies and the implementation of small scale renewable technologies - all national priorities. The Oxford Road Corridor in close proximity to two of Manchester's universities will provide the location for a 'low carbon laboratory' to develop and test new technologies, which specifically includes energy supply infrastructure and energy efficiency measures and offers a 'working vision' of a retrofitted low carbon city.

In the early months of 2010 the LCEA was still at the very early stages of development. Work to realise the LCEA requires partnership building and ways of working that develop the organisational, knowledge and financial capabilities to deliver it. There is no single source of funding for the LCEA. Rather the designation requires the city-region to work in partnership with numerous national actors and agencies, regional partners, and also to seek to secure funding from a range of national, regional and supranational funding streams. In this way the city-region must constantly position the LCEA to try and attract funding whilst also meet the multiple priorities and expectations of different partners.

The sectoral designation of Greater Manchester as an LCEA in the built environment and its spatial designation in part of the urban commercial and retail core appeared somewhat at odds with the city-region's initial view of a low carbon future being developed through a variety of activities in different spatial zones across the wider city-region. The tighter spatial view that was being promoted through the LCEA strongly reflected the priorities of national government's business department whilst the broader and enlarged view would require Greater Manchester to engage with different national priorities within the community, energy and environment departments. Although the claim is that both options are being kept open – it is the LCEA agenda where more appears to be happening through the retrofit of existing domestic and commercial buildings (Report to Environment Commission on Environment Commission Work Programme: Commissioner Roles, 2nd November 2009). This view is: narrower in terms of territorial scope; narrower in terms of technologies; and narrower in that it seeks, for example, to deliver – and provide a model for delivering - specific national priorities in relation to smart metering and mandatory carbon reduction targets.

Greater Manchester Energy Group – Creating City-Regional Energy Capability?

As part of the city-region pilot Greater Manchester was committed to establishing a multi-sectoral city-region Energy Group. This would provide effective strategic

governance working to coordinate energy and energy-related actors and issues at a city-regional scale. The Group would include energy companies, public and private sector interests, representatives from across the city-region commissions and from representatives of national government. The Group would be supported by officers who would work to develop and implement actions in support of energy aspects of a low carbon economy for Greater Manchester. The background to the Energy Group can be traced through meetings in spring of 2009 within the Environment Commission. Subsequent discussions were held between senior representatives of the Environment, Economic and Planning and Housing Commissions and also between city-region representatives and national government departments to discuss the centrality of the role of energy in the city region pilot.

The view that was laid out in the city region pilot and its precursor documents was that economic growth aspirations in an emerging low carbon era meant that the city region required greater security and reliability of infrastructure especially in relation to energy issues. A city-regional energy plan was proposed and ongoing work on energy planning has subsequently been integrated with the proposed work programme of the Energy Group. The Energy Group, although not explicitly part of the CCA, would in the 'medium term' see the CCA deliver the projects and programmes it developed.

The proposed role of the group is as a strategic overseer for energy issues in Greater Manchester including: identifying significant energy issues for the city region; representing city-regional interests at national and international levels; and, acting as a broker between the different interests necessary to overcome the difficulties in seeking to achieve a low carbon energy system. In doing this the Group would also act as a filter for energy bids and proposals to national and European levels, highlighting and endorsing those that originate in and focus upon low carbon energy infrastructure for the city region. Practically this would mean that within the context of a bundle of targets being developed at, or devolved to, the city-regional level the development of a performance framework to measure targets and model the implications of different scenarios, the development of a Framework Energy Plan for Greater Manchester and related to this,

attempts to engage in infrastructure delivery mechanisms. Also related are attempts to utilise the procurement activities of the public sector, through priorities and plans, with the priorities of any subsequent city region energy plan. Furthermore, the Group will seek to align corporate climate change strategies and investment programmes with the Energy Plan and also explore the possibilities that a city region level Investment Fund that could provide financing for specific energy projects.

Such an agenda potentially cuts across a wide range of plans, activities and social interests but it does so from an existing context where there is limited capacity and capability at a city-regional scale. This means that the activities envisaged by the Energy Group require new ways of bringing together public and private sector, utility and city-regional policy interests, different scales of policy interests, universities and business and so on – so returning full circle to the need for a CCA.

In summary then three city-regional energy intermediaries are being produced by a complicated set of relationships within Greater Manchester. These involve relationships particularly between the Environment and Economic Commissions, but also between Greater Manchester and national government, Greater Manchester and the NW Regional Development Agency, and at local authority levels. But the development of the CCA, LCEA and Energy Group is also caught within complex and messy combinations of these multiple scalar relationships at different times and instances. These pressures can be strongly externally driven through national government priorities, as in the case of LCEA designation, yet simultaneously are internally focused on the development of new capacity and capability through the Energy Group. These arrangements are still in a considerable state of uncertainty as the consequences of the new government public expenditure reduction, the abolition of the RDAs and establishment of LEPs.

5. Whose Low Carbon Urban Transition?

What the case of Greater Manchester demonstrates is the richness and multi-faceted character of an attempted transition in re-scaling an energy regime to a city-regional scale

within a broader national state space. National government priorities in relation to state spaces and energy in the UK in recent decades have promoted competition between places and the liberalisation and privatisation of energy markets. Pressures in recent years have seen some - albeit limited - questioning of this role of the state and the development of a view that the state can intervene directly and facilitate the transformation of places that were previously told to make themselves adaptable to the requirements and priorities of mobile capital. This was beginning to contribute to a collection of national priorities where the tension is between trying to buttress the existing growth model and to explore new forms of low carbon industrial interventionism. However, the new government's priorities signal a shift away from active intervention in partnership with urban and regional agencies to a simultaneously more localised approach through LEPs and stronger central control of more limited regeneration and green investment funds.

As we argued at the start of this paper the MLP has primarily been concerned with national level transitions and the role of the sub-national has been presented as one of primarily contributing to national transitions. Yet what the Greater Manchester example demonstrates is the complex territorial and national politics that coalesce within a city-region especially those of multiple, often contradictory, national priorities that shape and become incorporated in to place-based activities. National government engaging with cities is shorthand for a variety and multiplicity of relationships. Thus, who and what the city is in respect of transition is not reducible to place-based actors or institutions but needs to be understood through a multi-level, structural and processual politics of ongoing negotiation of priorities, possibilities and financial and knowledge resources. In times of the relatively stable reproduction of the city these structures and processes may be fairly constant whilst when priorities shift radically - exemplified by a change of national government - they require effort and new organisations within which to organise action to such ends.

In Greater Manchester low carbon activities were based on a narrow social 'vision' of transition. This was primarily focused on a vision of economic costs, economic potential and the possibilities of urban low carbon activities demonstrating how to achieve national

targets. This ‘vision’ was developed by exclusive coalitions with limited input from selected Greater Manchester social interests and through a national designation. In other words, the constitution of the vision was not part of a systemic participatory process of enrolling necessary and relevant others nor was it constituted as a space for struggle between competing potential visions and expectations. What followed from this was the development of three different intermediary organisational forms - CCA, LCEA, Energy Group - which although there were some overlaps in memberships were predicated on quite different geographies and priorities.

Each was also initially organised on short-term funding arrangements in a context of attempting to address longer-term transition in energy systems. This meant that vision and translation were not effectively interrelated and stabilised through organisational capacity and capability. They were also subject to struggle particularly in terms of the ‘economic’ and ‘environmental’ interests within the city-region - with the long established ‘economic’ interests holding the balance of power in shaping a low carbon agenda. This has had and will have significant implications for how national priorities are appropriated at the city-regional level and for the development of low carbon energy capabilities. There is limited capacity to act but where there is capacity it is being mobilised largely in relation to an economic agenda rather than the wider incorporation of environmental and social priorities. It is capacity that is predicated largely, though not solely, on the symbolic representation of transition rather the serious enactment of a transition.

The early stages of making a low carbon urban transition in Greater Manchester was predicated on a multiplicity of relationships and issues – that included public and private and national, regional, city-regional, local, supranational and business interests. The principal relationship was between national priorities and interests and a nascent city-regional governance framework that encapsulated different interests. Where capacity is being mediated and organised through the CCA this is being done through building relationships primarily horizontally and upwards with little downwards movement other than to select symbolically important projects and re-package them. This opens up the

issue of for what purpose are governance relationships being built? Are they about re-constituting a status quo – that is the continuation of a form of urban economic growth – or about genuine transformation?

Environmental interests and those of the incumbent energy regime are involved but remain relatively peripheral. In that sense the intermediary organisational forms mobilise a capacity to act that re-enforces the status quo of urban economic activity. There is not significant transformative capacity to re-configure and re-scale effectively the energy regime at the city-regional level - capacity to act is capacity to conservatively reproduce rather than radically transform. The dominant relationship is between the priorities of the strategic metropolitan level in Greater Manchester and national priorities and the ways in which they produce an ‘outward’ looking Greater Manchester agenda, a symbolic agenda in the vein of an urban entrepreneurialism that has reconfigured its narrative to include low carbon responses but where systemic transformation is much more difficult to find.

The transformative low carbon agenda within Greater Manchester is much more difficult to locate other than implicitly through reference to projects and the issue this raises is whether what is being developed is largely a symbolic transition, primarily for the purposes of competing in the eco-economic race between cities rather than contributing to a transformative place-based transition. This gets to the very heart of ‘who’ the city is. In the new governance arrangements it appears that the city, in this sense, is a strategic actor in the race between cities but with very limited operational capabilities. To put this another way, the strategic intentions of the city-region are largely disconnected from the city-region’s civil society and a notion of its public sphere. What we are seeing is that in the balance of relationships a low carbon transition in Greater Manchester is being driven by the national defining the city-regional and a narrow set of economic interests dominating the environmental.

6. Conclusions

In this paper we have used research conducted in Greater Manchester to examine organisational contexts constituted for the purpose of transition to a low carbon urban energy future. In this conclusion we examine their wider implications and issues for further research.

Firstly, we have sought to develop a better understanding of the dynamics of the relationships between a variety of national, regional, city-regional and local authority actors in addressing how low carbon urban transitions are made, or more accurately how the language of transitions is mobilised by narrow coalitions of interest that do not result in genuine, radical transition but, rather, work to reproduce the economic status quo. In particular we wanted to develop a more sophisticated appreciation of the ways in which urban low carbon transitions are constituted – and the extent to which they are practically delivered - as metropolitan level responses to national priorities – such as carbon control, new industrial interventionism, a systemic long-term UK low carbon transition, and innovation in relationships between national priorities and sub-national territories.

Secondly, our interest was in what shape these responses take, whether they are piecemeal or more strategic and systemic, the types of technologies implicated in responses, indeed whether these are primarily technological fixes or encompass cultural and behavioural change strategies or, indeed, both. But primarily what we were interested in was in the politics and organisation of how such a response was produced and enacted, who was involved and who was excluded – or more specifically, what sorts of social interests and views were represented in constituting a response? In particular we have sought to demonstrate that the relationship between city and energy system is not unproblematic. In a UK context this has historically meant that the organisation of energy regimes and those of urban coalitions of interests have often been organised at different scales. The implications of this are that conventional urban economic growth has been predicated on approaches that have not required a radical re-consideration of the energy regime. Energy regimes have usually supported rather than have been the specific focus of economic activity. A new set of ecological pressures have created the context whereby securing economic growth becomes much more tightly integrated with both the

vulnerability and security of energy supplies and the wider capability to exploit the economic benefits of symbolic allusion to low carbon urban transitions. In this sense energy issues become more strategic in urban economic development priorities and strategies.

This shift creates an increasing set of pressures for reconfiguring socio-technical energy regimes at a city-scale. In this respect this is not just about technological artefacts at a city scale but also the social interests, institutions and actors, who seek to shape a city-regional energy regime. Where energy regimes are often organised nationally and regionally this means creating organisational contexts - that creates the necessary but not sufficient conditions - for the constitution of an urban energy regime that allows for social interests from the existing regime and city-regional interests and policymakers to come together and communicate. In Greater Manchester the additional complication was that city-regional governance structures were themselves being re-made with a central role for climate change and energy governance in doing so. In doing this we were keen to demonstrate the messy politics of these organisational responses, the dominance of national and economic priorities that were being advocated and the narrowness of the urban transition that might be produced if these intermediary forms can be stabilised.

Finally, the landscape pressures that shape urban transitions are the subject of considerable discussion among national and urban political and policy interests, researchers, community groups and activists. In particular, how the challenges posed by climate change and the geopolitics of resource flows can and should be addressed in an emerging age of economic 'austerity' potentially has significant consequences for the shape of future urban transitions. In thinking about future research agendas and the mediation of social interests in low carbon urban transitions four issues would be worthy of further research. Firstly, in what different ways are the current confluence of economic and ecological crises and pressures being used to influence low carbon urban transitions? Are they being used to defend or challenge the status quo? Secondly, to what extent do these crises and pressures contribute to or constrain the possibilities for different notions of low carbon urban transitions? Thirdly, in different urban contexts to what extent is the

mediating of low carbon transitions a participatory process, how are these organised and with what consequences? Finally, must low carbon urban transitions emanate from a national or city-regional level? What are the possibilities for grassroots and community initiatives to inform such transitions?

References

AGMA Executive Board, (2009), 'Statutory City Regions And Greater Manchester Strategy', 27 February.

AGMA & Manchester Enterprises, (2008), 'The Manchester Multi-Area Agreement: Our City Region's Proposal to Government'.

BERR (2007) *Energy white paper: meeting the energy challenge*, HMSO: London

BIS/DECC, (2009), *Low Carbon Innovation Strategy: A Vision*, HM Government: London.

Bourdieu, P., (1993), *Sociology in Question*, Sage: London.

Brenner, N., (2004), *New State Spaces: Urban Governance and the Rescaling of Statehood*, Oxford University Press: New York.

Bulkeley, H., Castan-Broto, V., Hodson, M., and Marvin, S., (Eds), (2010), *Cities and Low Carbon Transitions*, Routledge: London.

Climate Change Act 2008.

Coenen, L., Benneworth, P., and Truffer, B., (forthcoming), Towards a spatial perspective on sustainability transitions, *Research Policy*.

Committee on Climate Change, (2008), *Building a low-carbon economy – The UK's contribution to tackling climate change The First Report of the Committee on Climate Change*, December, London.

Coutard, O., and Rutherford, J., (2010), Energy transition and city-region planning: understanding the spatial politics of systemic change, *Technology Analysis and Strategic Management* 22:6 711-727.

DCLG, (2008), 'Explanatory Note On Taking Forward Proposals On City-Regions in PBR 2008'.

DCLG, (2007), *The Review of Sub-National Economic Development and Regeneration Sub-national Review*, HM Government: London.

DECC, (2009a), *The UK Low Carbon Transition Plan*, HM Government: London.

DECC, (2009b), *The UK Renewable Energy Strategy*, HM Government: London.

Delivering An Energy Group And Plan For Greater Manchester: An Update On Progress, (2009), Report to Environment Commission 10th September.

Deloitte, (2008), 'Mini Stern' for Manchester: Assessing the Economic Impact of EU and UK Climate Change Legislation on Manchester City Region and the North West, September.

Environment Commission, (2010), Work Programme Implementation Plan, 20th January.

Geels, F., (2010) The role of cities in technological transitions: Analytical clarifications and historical examples in Bulkeley, H., Castan-Broto, V., Hodson, M., and Marvin, S., (Eds), (2010), *Cities and Low Carbon Transitions*, Routledge: London.

Geels F., (2005) Co-evolution of technology and society: The transition in water supply and personal hygiene in the Netherlands (1850–1930)—a case study in multi-level perspective, *Technology in Society*, 27, 363–397.

Geels, F., (2004) From sectoral systems of innovation to socio-technical systems. Insights about dynamics and change from sociology and institutional theory, *Research Policy* 33, 897-920.

Geels, F., (2002) 'Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case study', *Research Policy* 31, 1257-74.

Harvey, D., (2006) *Spaces of Global Capitalism. Towards a Theory of Uneven Geographical Development*, Verso: London.

Hodson, M., Marvin, S., Bulkeley, H., and Castan-Broto, V., Conclusion in Bulkeley, H., Castan-Broto, V., Hodson, M., and Marvin, S., (Eds), (2010), *Cities and Low Carbon Transitions*, Routledge: London.

Hodson, M., and Marvin, S., (2010a), *World Cities and Climate Change*, McGraw-Hill: Maidenhead.

Hodson, M., and Marvin, S., (2010b), Can cities shape socio-technical transitions and how would we know if they were? *Research Policy* 39:4, 477-485.

HM Treasury, (2009), Budget 2009

HM Treasury, (2008), Pre-Budget Review 2008

Infrastructure Cross Commission Working Report to Environment Commission, (2009), 10th September.

Manchester Independent Economic Review, (2009), Manchester Innovation Investment Fund.

Manchester Statutory City Region Agreement, (2009), December.

Massey, D., (2005) *For Space*, Sage: London.

Minutes Environment Commission (2009), 10th September.

Pickerill, J., (2010) in Bulkeley, H., Castan-Broto, V., Hodson, M., and Marvin, S., (Eds), (2010), *Cities and Low Carbon Transitions*, Routledge: London.

Prosperity for All: The Greater Manchester Strategy, (2009), August.

Report to Environment Commission on Environment Commission Away Day – 8 June 2009, (2009), 14th May.

Report to Environment Commission on Climate Change Agency, (2009), 14th May.

Report to Environment Commission on Energy Planning in Greater Manchester, (2009).

Report to Environment Commission on The Transition to a Low Carbon Economy, (2009), 16th July.

Report to Environment Commission on Environment Commission Work Programme: Commissioner Roles, (2009), 2nd November.

Report to Environment Commission on Low Carbon Economic Area and CCA Update, (2009), 2nd November.

Report to Environment Commission on Low Carbon Economic Area, (2010), 20 January.

Report to Environment Commission on Low Carbon Economic Area, (2010), 18th March.

Report to Planning and Housing Commission on Next Steps for the AGMA Decentralised/Low Carbon Energy Study, (2010), 17 March.

Shove, E., and Walker, G., 2007, 'CAUTION! Transitions ahead: politics, practice, and sustainable transition management' *Environment and Planning A* 39(4) 763–770

Smith, A., Voß, J.P. and J. Grin (2010) Innovation studies and sustainability transitions: the allure of the multi-level perspective, and its challenges *Research Policy* 39: 435-448.

Späth, P., and Rohrer, H., (2010) 'Energy Regions': The transformative power of regional discourses on socio-technical futures *Research Policy* 39(4) 449–458

While, A., (2010) The Carbon Calculus and Transitions In Urban Politics And Urban Political Theory in Bulkeley, H., Castan-Broto, V., Hodson, M., and Marvin, S., (Eds), (2010), *Cities and Low Carbon Transitions*, Routledge: London.

While, A., (2008) Climate change and planning: carbon control and spatial regulation *Town Planning Review* 79:1 vii-xiii.

Voß, J-P, Bauknecht, D., and Kemp, R., (2006) (eds) *Reflexive Governance for Sustainable Development*, Edward Elgar: Cheltenham.

ⁱ The chapters in a recent book (Bulkeley et al, 2010) explicitly exploring the role of cities in low carbon transitions detailed some of the many different ways of thinking about the roles of cities in this respect - the city as a transition actor, as a contributor to national level transitions (Geels, 2010), through the lens of decision-making calculus (While 2010), as constituted through multi-level governance coalitions of interest, the organisational cultures of urban transition (Hodson and Marvin, 2010a), but also through 'alternative' spaces within the city through which often marginalised voices seek to participate in low carbon transitions (Pickerill, 2010).

ⁱⁱ The LCTP claims that by 2020: more than 1.2 million people will be in green jobs; 7 million homes will have benefited from whole house makeovers, and more than 1.5 million households will be supported to produce their own clean energy; around 40 percent of electricity will be from low-carbon sources, from renewables, nuclear and clean coal; and the UK will be importing half the amount of gas that it otherwise would (LCTP, 2009).

ⁱⁱⁱ We use the terms Greater Manchester and Manchester city-region interchangeably.